

Building Learning Networks for Lifelong Learning

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Ladies and Gentlemen

It is a great pleasure for me to be invited as one of the keynote speakers for the celebration of the 23rd anniversary of our university. In November it is twenty years ago that I started working at this university which I consider to be one of the most innovative universities, providing open and flexible distance learning that is accessible for everyone in our Dutch society using modern learning technologies. Very recently I am appointed as the new Dean of the Educational Technology Expertise Centre (OTEC), the centre that invents, develops, tests, applies and teaches new methods and technologies to improve learning.

One of the activities of OTEC is to run the research and development programme "Learning Networks for Lifelong Learning" [1]. We started this programme in 2003 and many different projects have been defined under its umbrella. An example is the TENCompetence project [2], a large European funded project with the aim to develop new learning methods and tools to support lifelong competence development.

Given the background of our work at OTEC and the TENCompetence project, my mission for today is a simple one: I will advocate that we need to setup a substantial and integrated infrastructure for lifelong learning in the Netherlands. This infrastructure will be using computers, mobile phones and other smart devices as the main access points to a number of Internet-based learning services that can be used by everyone to test and develop their competences whenever and where-ever this is needed during their career. And of course, not only individuals will be able to use these services, but also organisations, teams and regions will be enabled to use it for the support of lifelong learning. We expect that the availability and massive use of such an infrastructure will have a considerable impact on our society, it will stimulate employability, stimulate innovation in organisations, and it will stimulate social inclusion, active citizenship and personal growth and fulfillment [3].

Today I will introduce you to some of the basic ideas behind Learning Networks. I will also discuss a concrete example in the area of 'digital cinema', and in the last part of this keynote I will address some recent research and development that we are doing.

Lifelong Learning

But first of all, I will introduce you shortly into the ideas behind 'lifelong learning'. We all know that job demands are changing very rapidly, mainly due to globalisation and the use of new technologies. Many jobs and tasks are becoming obsolete or change dramatically in nature. Even the way we communicate with our colleagues, family and friends is changing, due to the massive use of mobile and Internet technologies.

This has had, and will continue to have a major impact on the way our society is organised, how the markets will function, and how people will relate to other people. These changes also have a dramatic impact on the importance and position of learning: learning will be one of our main day-to-day activities, like eating, drinking and breathing. Learning must be intensified because learning is *the* way to cope with all the changes in jobs, tasks and technologies. Furthermore, most of this learning will take

place outside of the context of schools and classrooms: learning must be integrated as much as possible into our day-to-day work and living activities.

The need to stimulate lifelong learning in society is broadly recognised and is expressed in many different national and international policy documents. For instance the European Commission [4] has formulated a target for lifelong learning for the year 2010: they want to increase the average level of participation in lifelong learning to at least 12.5% of the adult working age population (24-64 age group). The Dutch government [5] states in her own policies that they want to belong to the three best performing countries in Europe, which means that we target at 20% participation in lifelong learning in our country.

A critical note has to be made about the way lifelong learning is measured in these governmental studies. It is measured by asking people to indicate whether they have been involved in any education or training activity in the last four weeks. People tend to answer this question positively when they have been involved in managed learning activities like courses or training events. However, the majority of the lifelong learning at work and at home has an informal nature [6] and is integrated into the work and other daily activities itself. Livingstone [7] has found in a recent study in Canada that 85% of the citizens performed some kind of informal learning activities, spending an average of 13 hours per week, including 6 hours of informal learning per week at the workplace.

So, when we talk about lifelong learning we should include and recognize the whole spectrum of possible learning activities: formal as well as informal.

The need to setup a substantial infrastructure for lifelong learning in the Netherlands has also recently been expressed by the OECD [8, p.70]. In evaluating our tertiary educational system, they state that our educational system is focusing too much on the earlier stages in life:

"... there are many thousands of [...] students who might have benefit from an academic education who are streamed away from it at an early age, and do not find their way back. Because of limited opportunities to track upwards and the absence of an infrastructure for lifelong learning at scale there are few second chances."

Also in earlier reports the OECD [9] identified various barriers in our society for lifelong learning, most notably they advice to create more flexible chances for the individual, to provide instruments to assess informal learning and to increase awareness of the population for the existence of the various formal and informal learning facilities (see also [10]).

A key question, not answered by any of these reports, is how such an infrastructure would look like in more detail. This is what we have worked on in the past few years in terms of the Learning Networks concept, but before I will go into more detail, I will give you a concrete example of a professional area we are working on in the TENCompetence project, the area of Digital Cinema. This example contains most of the high-level requirements that we should address in an infrastructure for lifelong learning, i.e. Learning Networks for Lifelong Learning.

Example: Digital Cinema

One of the areas that is rapidly changing is the film industry. At a time that everybody can have their own theater sets at home, cinema's are under pressure to deliver a better experience and a higher quality to stay attractive. Only very recently it is possible to use digital technologies in the whole chain of movie production, distribution and projection. This new process provides a complete new experience of audio and video quality. The implementation has been started some years ago, the number of digital cinema's is increasing rapidly and – as you can imagine - major investments are involved. As a consequence of this innovation, the functions and the labour involved in the film industry will change fundamentally. Some new jobs will appear, some jobs will fundamentally change and many activities will be obsolete.

We analysed this process in the TENCompetence project [see 12] and we came up with a set of requirements that must be fulfilled in order to serve the learning needs in this area:

1. The first requirement is that the infrastructure for lifelong learning should provide *open and geographically distributed access* to every professional in the industry to upgrade and update their competences, starting from their own level and needs. Massive development of new competences are required. The cinema production and post-production is a highly distributed industry. The teams who come together to work on a production may be drawn from many different areas and countries, and post-production may be carried out by specialised companies in different countries.
2. The new infrastructure should support the building of *communities of practice* in which the relatively isolated professionals are stimulated to exchange knowledge and experience with their peers and in which the professionals at all levels support each other to solve problems. Although there are many different specialists involved in digital movie production, many teams only involve one or two of these professionals. As a consequence, the exchange of experience and knowledge between professionals is hindered by the absence of direct social contacts.
3. The new infrastructure should provide *highly flexible, self-directed learning opportunities* that are integrated into the day to day schedules of the busy professionals in the area. Cinema professionals have valuable skills which are in high demand. Many also have to structure their working life according to the demands of production schedules, and cannot guarantee that they will be available for long periods of time in the same location. This means that highly flexible learning activities will be required to meet the needs of the domain.
4. The actors involved in digital cinema need *individualised learning approaches*, based on their existing competences and the type of work they will be performing. Most of the workers in the digital cinema area already have mastered some digital knowledge and skills, and also the job demands, preferences and circumstances for each individual are highly different. In this context it is inefficient to use standard courses for training: it is more effective to create personal development plans for each individual.
5. And last but not least, there should be a *flexible qualification system* in place that stimulates and certifies informal learning [see also 9]. This will facilitate the labour market in the industry: especially the formation of competent (post-)production teams in which the total team competences are of more importance than the specific set of individual competences.

Learning Networks

For workers in the digital cinema area, and all other areas with similar problems, we are developing the Learning Networks concept. One of the major underlying assumptions is that the traditional education model, using classrooms with students and teachers, has a couple of disadvantages that makes it largely unsuitable for massive support of lifelong learning. We should revise the model fundamentally, because of at least four reasons:

1. First of all, the traditional model is highly dependent on the availability of high quality teaching staff. There is a structural shortage of teachers in the first place (see for instance the recent report from Alexander Rinnooy Kan [11]), that describes a real dramatic situation in the near future), but also, in order to keep their qualifications, the teachers should be lifelong learners themselves: they should also be permanently informed and updated to keep up with the massive changes in knowledge and skills. The problems of teachers are comparable to the situation of the professional in the Digital Cinema industry: also teachers need Learning Networks to keep up with the changes and to increase their qualification levels.
2. A second reason is that the traditional model does not really fit the demands and lives of the modern adult who has to manage many different priorities and wants to be as independent of place, time, and other constraints as possible. Adults prefer to exchange knowledge with colleagues and friends, by going to conferences and workshops, by reading articles or books and by browsing the Internet. Adults want to direct their learning activities themselves, lifelong learning should be integrated within daily work and life.
3. A third reason is that current jobs are becoming so demanding that most of the work will be

done in teams of different professionals. In practice these teams do not have fixed roles, but care is taken that the sum of the competences of the individuals are sufficient to do a job. So the demarcation between jobs and professions are becoming less clear: someone who can perform a certain set of tasks will be asked to do so, and when you have competence gaps, someone else can fill this up for you in the team. This new team based work provides much more opportunities for the individual to develop their talents to a maximum without being forced to loose time on areas where they are less interested or are less talented. So, instead of classrooms where everybody is developing the same competences, we are better off when each professional has to work on the development of their competences depending on interests and talents.

Individualized, Personal Development Plans are the key instrument in lifelong learning.

4. The fourth reason is that new mobile devices and Web 2.0 Internet services are maturing in a way that they are becoming the universal portal to knowledge, communication and collaboration. This fact on its own will have an enormous impact on the way education and training or more in general 'learning' is organised in our future society. An increasing number of persons are using tools like Google as their primary source of information. They are sharing information through services like blogs and del.icio.us as never before and slowly but steadily also Web 2.0 services like Zoho will replace the existing desktop applications, allowing various new kinds of collaborations among professionals.

To summarize, in order to facilitate lifelong learning we need an Internet-based infrastructure that is open accessible by every individual in our society to stimulate, support and acknowledge formal and informal learning that is embedded in various communities of practice. This is the aim of Learning Networks.

Typically, persons can join a Learning Network related to their profession, for instance the network of movie directors, but also many other networks that are related to their interests. The people in a Learning Network can change roles all the time: sometimes they are learners, sometimes they are teachers and sometimes they are professionals who answer questions or solve problems. Sometimes they are composing their own learning resources, sometimes they use resources that are created by peers in the network and sometimes they use courses and programmes that are supplied by educational institutions like the Open University. Learning Networks are in principle self-organised and contain a set of services that you use to contact people and to create, share and find resources. These services can be selected on a case by case basis to create a personal learning environment [13] or can be bundled to create a managed learning environment within a school, university, or company [14].

It is by the way good to note that the Learning Networks for lifelong learning that we envisage is not aiming to replace the current infrastructure for primary, secondary, and tertiary education. It is envisaged as an additional infrastructure for people who have left school, with or without a start qualification, and who want to upgrade, update and certify their competences in various areas during life.

Current Research and Development

In OTEC we are also working on a large number of research and development projects related to Learning Networks that will enable us to setup these networks in a more effective and efficient way in the future. I will give you three examples. When you are interested in more details, you can go to the TENCompetence website (www.tencompetence.org) or the OUNL dspace site (dspace.ou.nl) for more information, publications, software, etc.

Personal Competence Manager

First of all, we are working on an Internet service called the Personal Competence Manager [15]. This is the most crucial service that will enable individuals and groups to setup their own Learning Networks. The PCM will have its major value for people after they have finished their initial education, with or without a start qualification. It supports persons to continue to learn during the rest of their lives. With this freely available service, everyone will be able to create, subscribe and participate in various Learning Networks; will be able to define competences s/he wants to develop, will be able to create personal development plans and use and share various formal and informal learning resources. People

are able to contact other persons and friends in the network, chat with them, mail with them, having forum discussions, etc.

The first version that includes all functionality we want to implement [16] has been released in June.

Currently we are grouping the different services for various user roles:

- create personal development plans;
- share knowledge within a community;
- create and follow structured learning activities (e.g. courses, lessons);
- store portfolio data, and
- assess competences at various qualification levels.

Navigation within Learning Networks

A second topic I want to mention is the work we are doing on navigation issues within Learning Networks. People are overwhelmed with information and choices, and often they do not find the most adequate solution. A navigation service will help persons to select the best solution, fitting their needs and situation. Given the massive amount of learning resources at the Internet there is a need to automate this kind of advice. These systems are called recommender systems and they have proven to be useful in many domains like ordering books at Amazon. To develop and test good algorithms for recommendations in the learning field, we first build a simulator. Using the simulator, we developed an algorithm that could increase the level of successful learning (and decrease drop-out) with around 10% [17]. The next step was to test this algorithm in practice. We have executed an experiment with a 1000 learners in the Learning Network, randomly assigned to a control group and an experimental group. In this real life experiment we were able to confirm the prediction: persons who were supported with the automated navigation algorithm made more progress [18]. We are now continuing the research by taking personal characteristics into account in the advice given to the learners in an attempt to attain even more effect. A new simulation has been produced and an empirical study has been executed very recently [19].

Latent Semantic Analysis

A third and last example is related to the workload of people who have the role of teachers in the Learning Network. Remember that everybody can take this role in the Learning Network from time to time, depending on the available competences and the issues at hand. In modern approaches to learning, learners are stimulated to be more actively engaged in real world tasks. Learners are also stimulated to create more products, like reports, blogs and wikis, instead of consuming knowledge by reading. As a result more and more products are created and shared, but it would be nice to assess the quality of these products and to provide feedback for the learners on the quality of these products [20]. Also learners are stimulated to ask more questions as part of their learning process. As a result a group can formulate hundreds of different questions that need an answer.

In traditional educational settings it would typically be a task for a teacher to read all the products and to answer the questions of students, but this will overload the teacher. One way to solve this problem is to automate the correction and feedback work as much as possible, and to spread the workload between all the members of the network instead of making this a task for the teachers alone.

In various studies we are exploring the use of language technologies, more specifically a technique called Latent Semantic Analysis (LSA) [21, 22] to automate parts of these tasks. For instance in an experiment that has recently been carried out by Peter van Rosmalen [23], a learner can ask a question, the LSA engine analyses which person in the Learning Network is able and available to answer the question and the message is forwarded to the right persons. Care is taken that the workload is spread among all the participants. The results of the experiment with approximately 110 persons in the Learning Network showed that it is possible to find the right persons in the Learning Network to assist their fellow learners in answering their questions, and that persons selected in this way outperform persons selected at random both with regard to the quality of the answers but also with regard to their responsiveness.

The impact of this work is easily to imagine, not only in the context of Learning Networks, but also in the field of helpdesks.

As I have said, this is only a very limited selection of examples. There are many more topics that are of interest, like Mobile Learning Technologies, Serious Games, Competence Assessment, ePortfolio's, matching of competences, Learning Design Technologies, e-learning standards and Web 2.0 technologies for learning. All these technologies are tested in various areas in the TENCompetence

project, most notably digital cinema, the health care sector, the City of Antwerp, and together with UNESCO-IHE in the area of water management, specifically in the Nile region.

The basic research and pilots are planned to be finished at the end of 2009, but anyone who is interested to setup related projects is welcomed to contact us and to participate, because as I have said earlier: it is now time to setup a substantial and integrated infrastructure for lifelong learning in our society.

Thank you for your attention.

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